

1 ABSTRACT OF THE INVENTION

2

3 Method and Apparatus for Separating Emulsified Water from Fuel

4

5 The invention discloses an apparatus for filtration of water from hydrocarbons
6 comprised of a fresh-feed inlet, a first dead end filter, having a filter medium that is
7 hydrophobic, a second cross-flow filter, having a membrane that is hydrophobic, a
8 common housing to contain both the first and second filters, a system for the
9 recirculation of the retentate, a chamber for water settling, and an outlet for clean fuel
10 permeate. This invention takes advantage of the properties of the functional groups of
11 a surfactant, by using the surfactant to allow a hydrophobic medium to attract water,
12 attach the water molecules to the hydrophobic medium, and then allow for
13 agglomeration of the water molecules, which finally become large enough to detach
14 and be swept away by the cross-flow. The hydrocarbon may then pass through the
15 second membrane filter uncontaminated by water and be used as clean fuel. This
16 invention can thus be used to remove high concentrations of water, up to 5%, in
17 hydrocarbons, while allowing a high flow rate by preventing blockage of the final filter
18 by water.